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10/646,146

08/22/2003

Saul Griffith

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26242 7590 02/17/2009

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EXAMINER

LAM, CATHY FONG FONG

ART UNIT

PAPER NUMBER

1794

MAIL DATE

DELIVERY MODE

02/17/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |  |  |
|------------------------------|--------------------------------------|--|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/646,146 | <b>Applicant(s)</b><br>GRIFFITH ET AL. |  |
|                              | <b>Examiner</b><br>Cathy Lam         | <b>Art Unit</b><br>1794                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 December 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 23-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 23-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

In view of the amendment and remarks filed on Dec. 04, 2008, the pending claims continue to be unpatentable as following:

***Claim Rejections - 35 USC § 112***

1. Claim 23 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is vague and indefinite as to whether or not the "*nanoparticles* encapsulated within..." is the same nanoparticles (material) in the conductive material? Clarification is required.

***Claim Rejections - 35 USC § 102/103***

1. Claims 23-26 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Notenboom et al (WO 97/38810).

Notenboom discloses a sintered structure on a substrate. Notenboom's product is particularly useful for forming multilayer electronic components (page 2 bottom thru page 3 top).

The sintered structure is formed from a metal paste which comprised of metal particles in the form of sol-gel solution or colloidal solution. The metal particles are in aqueous and/or organic matrix (page 6 Example 2). Here the examiner is taking the position that the aqueous and organic matrix are the hydrocarbon capping groups. The metal particles having an average particle size between 10 to 100 nm (page 3 L 28-29). The substrate can be a dielectric layer (page L 17).

After the metal paste is deposited over the substrate, the substrate is locally heated with laser irradiated upon the metal paste only and to evaporate the liquid and to sinter the metal particles (page 2 L 25-28 & page 5 L 25-26).

Shrinkage of the metal paste (layer) occurs during sintering in a direction at right angles of the substrate, whereas the shrinkage of the metal paste (layer) is negligibly small in the direction parallel to the substrate (page 4 L 22-24).

Due to some indefiniteness of the nanoparticles as claimed, the examiner is taking the position that the nanoparticles encapsulated within insulative shells being the same as the nanoparticles in the conductive material.

Notenboom is silent about the characteristics of the metal paste outside of the laser irradiated portion. Since Notenboom does not explicitly teach irradiating the metal paste in its total area, thus it would have been obvious that the sintered portion of the metal paste becomes conductive because laser irradiated over the metal paste (or sol-gel solution) burns the organic material and causing the metal particles to draw closer or fused together, thus turning the metal paste into a conductive layer; and the unsintered portion (or not laser irradiated) would be encapsulated within the aqueous and/or organic material.

2. Claims 23-26 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Watanabe et al (US 5587111).

Watanabe discloses an electrical device comprised of a metal paste. The metal paste is comprised of fine metal particles having average particle size of less than 1000

Art Unit: 1794

Å (or 100 nm), preferably the particle size is from about 10 Å to about 100 Å (i.e. 1-10 nm) (col 4 L 50-52).

The fine metal particles are mixed with an organic solvent and surface active agent (col 4 L 37-42). The solvents are hydrocarbons (col 4 L 5-15).

The metal paste is formed onto an alumina substrate, and then sintered to give a **wiring pattern** (col 6 L 14-17). The sintering step can be done by laser (col 10 L 47-55). The examiner is taking the position that the organic solvents are the claimed capping groups.

Watanabe discloses that sintering the metal paste would reduce the resistance, in other words increases conductivity. This is due to densification of the metal particles and burning of organic solvents during sintering (col 6 L 25-34).

Watanabe's metal paste is used for forming a wiring pattern. Watanabe however is silent about the area of the metal paste that was not sintered.

In view of the prior art teaching, it would have been obvious that the non-sintered area would have a higher resistance because the metal particles were dispersed and separated in organic materials. The examiner is taking the position that the non-sintered area is within the insulative shells which are the organic materials.

### ***Response to Arguments***

3. Applicant's arguments filed on Dec. 04, 2008 have been fully considered but they are not persuasive.

Applicant in the remarks argues that the two prior art cited do not teach the nanoparticles were encapsulated within insulative shells.

Since applicant did not clearly distinguish the nanoparticles under the insulative shells and the nanoparticles in the conductive material, the claims can be met by the prior art because the organic material in which the nanoparticles was dispersed could be taken as the insulative shells. Furthermore, areas where the laser energy did not irradiate upon in the prior art would meet the present invention.

### ***Conclusion***

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cathy Lam whose telephone number is (571) 272-1538. The examiner can normally be reached on 9am-6pm.

Art Unit: 1794

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye can be reached on (571) 272-3186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cathy Lam/  
Primary Examiner, Art Unit 1794